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DEPARTMENT OF ECOLOGY
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April 30, 2003

CERTIFIED MAIL

Ms. Jessie Hill Roberson
5A-014, Forrestal Building
U. S. Department of Energy
1000 Independence Avenue, S. W.
Washington D. C. 20585

Mr. Keith Klein
United States Department of Energy
Richland Operations
P.O. Box 550, MSIN: A7-50
Richland, Washington 99352

Dear Ms. Roberson and Mr. Klein:

RE: U. S. Department of Energy's failure to comply with Chapter 70.105 Revised Code of Washington (RCW), Chapter 173-303 Washington Administrative Code (WAC), and by reference, Title 40, Code of Federal Regulations (CFR); Administrative Order No. 03NWPKW-5494.

Enclosed is Order No. 03NWPKW-5494. If you have any questions concerning the content of this document, Please call Bob Wilson at (509) 736-3031. The enclosed Order may be appealed. If you choose to do so, appeal procedures are described in the Order.

Sincerely,

Tom Fitzsimmons,
Director

Enclosure

c. Gary Burke, CTUIR
Nick Ceto, EPA Region 10
L. John Iani, EPA Region 10
Todd Martin, HAB
Samuel Penney, Nez Perce
George Sanders, DOE RL
Joe Shorin, WA AGO
Ross Sockzehigh, YIN

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

IN THE MATTER OF AN ADMINISTRATIVE ORDER AGAINST:	)	**ORDER No. 03NWPKW-5494**
United States Department of Energy Richland Operations WA7890008967	)	

TO: Ms. Jessie Hill Roberson
5A-014, Forrestal Building
U. S. Department of Energy
1000 Independence Avenue, S. W.
Washington D. C. 20585

Mr. Keith Klein
United States Department of Energy
Richland Operations
P.O. Box 550, MSIN: A7-50
Richland, Washington 99352

This is an Administrative Order requiring the United States Department of Energy (DOE) to comply with Chapter 70.105 Revised Code of Washington (RCW), Washington State's Hazardous Waste Management Act (HWMA), and Chapter 173-303 Washington Administrative Code (WAC), the State's Dangerous Waste Regulations, and by reference, Title 40, Code of Federal Regulations (CFR), by taking certain actions which are described below. Chapter 70.105 RCW authorizes the Department of Ecology (Ecology) to issue Administrative Orders requiring compliance, whenever it determines that a person has violated any provision of Chapter 70.105 RCW. RCW 70.105.005(2) states "The legislature hereby finds and declares: Safe and responsible management of hazardous waste is necessary to prevent adverse effects on the environment and to protect public health and safety."

Ecology determinations that violations have occurred are based on the following facts:

I. Retrievably Stored Wastes (RSW) within DOE burial grounds 218-E-12B, 218-W-3A, 218-W-4B and 218-W-4C

Dangerous Waste Determination

Washington's Dangerous Waste Regulations require that all generators of solid waste(s) not specifically exempted or excluded by WAC 173-303 or Ecology must determine whether or not

their solid waste(s) designate as regulated Dangerous Waste (DW) or Extremely Hazardous Waste (EHW). In the matter of solid wastes generated by DOE and stored within its "retrievably stored waste" (RSW) trenches, DOE has not complied with these requirements.

DOE is currently storing approximately 15,000 cubic meters (the equivalent of approximately 75,000 – 55 gallon drums) of RSW that has not been designated pursuant to WAC 173-303-070. This undesignated waste is currently stored in DOE's Hanford site Burial Grounds 218-E-12B, 218-W-3A, 218-W-4B and 218-W-4C. DOE placed this waste into storage after (April 30 of) 1970 as directed by the U. S. Atomic Energy Commission[1].

Ecology began regulating mixed waste on August 19, 1987, the date RCW 70.105.109 went into effect. DOE was then required to designate all of the wastes in question. DOE and its contractors have documented[2] that this waste contains hazardous constituents that will cause a significant, but unknown portion of it to designate as Dangerous or Extremely Hazardous Waste[3]. Examples of associated documentation include, but are not limited to the following:

1.) "Radioactive solid wastes were never segregated from other radioactive waste (except for compatibility) or even treated as hazardous waste until the EPA regulations, enforced through the State of Washington, were implemented in the burial ground facilities. Based upon the knowledge of the hazardous materials that have been received at the Hanford Site, and the use of these items in radiation zones, it is known that they were disposed in the burial grounds. Large quantities of lead along with other materials such as PCBs have been disposed in the burial grounds... It is known that some of this material went into TRU [transuranic waste] storage."[4]

2.) Soil mined from DOE's Hanford site 216-Z-9 crib could contain hazardous constituents at levels causing it to designate. The 216-Z-9 crib was used for the disposal of liquid waste containing organics and liquid plutonium from the Recouplex Plutonium Scrap Recovery Facility in the 234-5 Z Plant. The organic liquid came mainly from the processing areas and consisted of carbon tetrachloride and tributyl phosphate. After discharges stopped, measurements and analyses of trench soil plutonium content led to concerns that a criticality might be possible in the crib. This concern was alleviated when it was determined that the measuring equipment was defective. Meanwhile, a liquid solution of cadmium nitrate was added to the soil to poison the neutrons. Later it was decided that the first foot of soil should be removed. The removed soil was placed in containers and retrievably stored in the 218-W-4C burial ground.[5]

3.) Liquid organics have been retrievably stored in the 218-W-3A Burial Ground. "This burial ground received contaminated equipment and waste from offsite waste generators, 200 West

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[1] United States Atomic Energy Commission, Immediate Action Directive 0511-21, March 20, 1970.
[2] See "The History of the 200 Area Burial Ground Facilities", WHC-EP-0912, J.D. Anderson, September 1996.
[3] "Virtually all radioactive waste substances yielded in the process of producing or utilizing special nuclear material are contained, dissolved or suspended in non radioactive chemical media." FINAL ENVIRONMENTAL IMPACT STATEMENT, Disposal of Hanford Defense High-Level, Transuranic and Tank Wastes, U. S. Department of Energy, DOE/EIS-0113, Volume 1 of 5, section 3.2.7, December, 1987.
[4] See "The History of the 200 Area Burial Ground Facilities", WHC-EP-0912, J.D. Anderson, September 1996, Section 2.8.
[5] See "The History of the 200 Area Burial Ground Facilities", WHC-EP-0912, J.D. Anderson, September 1996, Section 4.4.4.

> Area operations, and all of the Hanford site with the exception of 200 East Area. This was the first burial ground in 200 West Area to receive TRU [transuranic] waste for retrievable storage when the AEC directed that TRU [transuranic] waste be segregated. In addition to TRU [transuranic] waste, liquid organics (some of which are hazardous by today's standards) have been retrievably stored in this burial ground."[6]

DOE began retrievably storing transuranic waste in May of 1970. At that time the transuranic determination was based on the waste having a radionuclide content of 10nCi/g. Waste with a transuranic content greater than this limit was retrievably stored. In 1982, the limit was revised upward to the present value of 100 nCi/g. Thus a portion of the waste retrievably stored prior to 1982 is no longer considered transuranic. DOE has estimated[7] that 47% of the retrievable stored drums and 32% of all retrievable stored containers will be determined to be low-level waste.

In addition, DOE has documented[8] that information in its records is not adequate to meet RCRA/HWMA requirements for designation, and recommends additional sampling to meet those requirements. In order to be adequately characterized and designated, DOE's buried RSW must first be retrieved.

Because wastes within DOE's RSW trenches have not been designated pursuant to WAC 173-303-070, and because DOE has documented that a significant, but unknown portion of its RSW is expected to contain hazardous constituents causing it to designate as DW or EHW, all DOE RSW is considered suspect mixed-waste until designated otherwise pursuant to the requirements of WAC 173-303-070. DOE is required to store its mixed wastes in compliance with interim status standards of WAC 173-303-400 and by reference WAC 173-303-630(3) and 40 CFR 265 Subpart I. Such requirements include the following:

Inspections

WAC 173-303-400 and by reference 40 CFR 265.174 require that the owner or operator of hazardous waste facilities perform inspections, at least weekly, to determine if its containers are leaking or showing signs of deterioration. DOE's practice has been to cover RSW containers with soil, making it impossible to perform meaningful inspections. Consequently, DOE has failed to comply with this requirement

Information that Ecology has acquired indicates that DOE has performed two separate inspections on specific burial grounds in which suspect mixed waste was stored as RSW. The first inspection was performed in 1982[9] at 218-W-4B, Trench 7, Module 1, (the northeast corner). Drums at this location had been stored for 8.5 years at the time of inspection. The inspection was conducted to determine corrosion rates and overall drum conditions. Drum corrosion was measured by ultrasonics. Based on

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[6] See "The History of the 200 Area Burial Ground Facilities", WHC-EP-0912, J.D. Anderson, September 1996, Section 2.3.26.

[7] See "Contact-Handled Transuranic Waste Characterization Based on Existing Records", WHC-EP-0225, Revision 1, September 1991, Section 4.11, Page 4-12 and 4-13.

[8] See "Contact-Handled Transuranic Waste Characterization Based on Existing Records", WHC-EP-0225, Revision 1, September 1991, Section 4.11, Page 4-13.

[9] See "The History of the 200 Area Burial Ground Facilities", WHC-EP-0912, J.D. Anderson, September 1996, Section 4.7

the inspection, the report recommended that these drums be inspected again in 1987-88. To date, the condition of these drums has not been re-evaluated.

The second inspection was conducted in July, 1994[10]. The original scope of this inspection was to cover 19 sites to include as broad a representation as possible of the variables of time and container storage environment. However, only 2 of the 19 sites were actually investigated. The two sites included 218-W-4C, Trench 1, Module 3 and 218-W-4C, Trench 4, Module 8. Drums at these locations had been retrievably stored since 1979-80 (14 years at the time of inspection). A conclusion of this inspection was that the two modules investigated may not be representative of other modules, in particular those without tarps or asphalt pads.

Both of these inspections involved modules where drums were first placed on an asphalt pad, then covered with a tarp before being backfilled. DOE has also stored drums of suspect mixed waste by method of direct burial in unlined trenches and has used wood, fiber reinforced plastic, concrete and cardboard boxes as well as other "miscellaneous containers" to retrievably store suspect mixed waste[11] and has not inspected these on any regular basis to determine the condition of the containers. DOE has not complied with the requirement that it inspects container storage areas at least weekly, and therefore cannot identify deteriorating or leaking containers.

Container Condition

WAC 173-303-400 and by reference 40 CFR 265.171 require that if a container holding a dangerous waste is not in good condition or if it begins to leak, the owner or operator must transfer the dangerous waste from the container to a container that is in good condition.

DOE's 1996 Risk Data Sheet states that a great number of DOE's RSW containers "are expected to be degraded beyond the capability of handling without specially designed equipment."[12] In addition, DOE has documented that in the case of 200 Area caisson waste management practices, waste packages containing suspect mixed waste have been allowed to fall freely into the caissons, which resulted in damage to waste containers and at times the rupture of packages.[13] DOE has not transferred the suspect mixed waste from failed containers within the caissons into containers that are in good condition.

In burial ground 218-W-4C, DOE is storing as RSW suspect mixed waste containing carbon tetrachloride. This waste resulted from soil removal actions at its 216-Z-9 crib. During the removal action, and because of the high moisture and organic content of the soils, DOE determined that hydrogen generation might exceed explosive limits in little over one month from the time of packaging. Because of this discovery, DOE installed vents in the drums to allow hydrogen to escape[14].

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[10] See "Degradation of the Transuranic Waste Drums In Underground Storage At The Hanford Site", WHC-SA-3019-FP, D.R. Duncan, J.A. Demuter and D.C. DeRosa, May 1996

[11] See "Contact-Handled Transuranic Waste Characterization Based on Existing Records", WHC-EP-0225, Revision 1, September 1991, Appendix D.

[12] See US Department of Energy, EM Management Plan, Risk Data Sheet Number R96N0016.

[13] See "The History of the 200 Area Burial Ground Facilities", WHC-EP-0912, J.D. Anderson, September 1996, Section 2.10.1.

[14] See "The History of the 200 Area Burial Ground Facilities", WHC-EP-0912, J.D. Anderson, September 1996, Section 4.4.4.

Recent monitoring data around those trenches indicate carbon tetrachloride releases from these burial grounds. A subsequent report[15] noted that:

> "The vent risers at the 218-W-4C Burial Ground were sampled and analyzed on May 8 and 9, 2002. Carbon tetrachloride was detected at all but one of the vent risers sampled. Most of the detections were less than 10 ppmv, but a distinct "hot spot" (maximum concentration of 1,760 ppmv) was detected at the east end of trench 4 ... The vent risers are generally aligned with the centers of the burial ground trenches. During sampling at the vent risers, the soil vapor samples were collected from within the trenches."

The 1982 inspection, mentioned previously, measured a maximum corrosion rate of 1 mil/yr at the drum-plastic interface. However, DOE concluded that at the measured corrosion rate, the drums could be anticipated to remain structurally sound and contamination-free for their anticipated 20-year storage life. These particular drums have now been stored for almost 30 years.

The 1994 inspection, mentioned previously, showed that "the majority of drums inspected (probably over three-fourths) had appreciable areas where paint had flaked off or corrosion begun." In addition, 20 percent of the drums inspected ultrasonically had measurable corrosion and one drum was found to be breached in two areas about 0.25 inch in diameter. This investigation reported a maximum corrosion rate of 2 mil/yr.

These inspections were performed on drums that were stored on asphalt pads and covered with tarps prior to being covered by soil. Earlier practices were to bury painted steel drums in direct contact with the soil. Based on previous corrosion studies DOE has estimated that the range of corrosion expected in these drums is 2.5-7.5 mils/year. This rate would lead to initial penetration of DOT 17H drums (18 gauge or 0.050 in steel-wall thickness) in approximately 7 to 20 years. Thicker DOT 17C drums (16 gauge or 0.062 in. steel-wall thickness) would be penetrated in approximately 8 to 25 years.[16] The report goes on to conclude[17] that waste placed in trenches that were not covered with plastic will have a significant number of breached drums and the plywood containers will probably crumble. Such waste was emplaced in the 218-W-12B burial ground, trenches 17 and 27; 218-W-3A burial ground, trenches 1, 4, 6, 15, 23, 30, 32 and 34; and 218-W-4B burial ground, trench 11.

DOE's 1996 Risk Data Sheet[18] states that "Continued below grade storage of TRU [transuranic] material is one of the Solid Waste Program's highest safety concerns". Further, DOE states that "solid radioactive and hazardous waste remain underground in deteriorating containers that have exceeded their design life causing soil and eventual groundwater contamination."

DOE has not retrieved and/or repackaged drums of suspect mixed wastes that are deteriorating and causing or likely to cause soil contamination.

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[15] Supplement to the 200-PW-1 Operable Unit Dispersed Carbon tetrachloride Vadose Zone Plume Sampling and Analysis Plan – Step 1, DOE/RL-2001-67, Rev 0, Concurrences shown as, A. C. Tortoso (DOE RL), D. A. Faulk (EPA Region 10), and John B. Price (Ecology), July 25, 2002.

[16] See "Contact-Handled Transuranic Waste Characterization Based on Existing Records", WHC-EP-0225, Revision 1, September 1991, Section 6.4.

[17] See "Contact-Handled Transuranic Waste Characterization Based on Existing Records", WHC-EP-0225, Revision 1, September 1991, Section 6.5.

[18] See US Department of Energy, EM Management Plan, Risk Data Sheet Number R96N0013

Identification of Containers

WAC 173-303-400 and by reference WAC 173-303-630(3) require the owner or operator to label containers in a manner which adequately identifies the major risk(s) associated with the contents of the container. The owner or operator must also ensure that labels are not obscured, removed or otherwise unreadable.

Storage of suspect mixed waste containers by burial in trenches with soil covering, by its very nature, obscures labels. In addition, DOE has engaged in practices that do not ensure that labels remained intact and adhered to their container. In 1981, DOE learned that the Krylon paint used to label the drums would not last the required 20-year storage time.[19] DOE has not inspected drums labeled with the Krylon paint to determine the condition of these labeled drums that have now been buried for over 20 years.

DOE has documented that "Container labeling methods are not long-lived, or were not tracked, and will provide little positive container identification information (for containers emplaced before 1982) at retrieval."[20] In addition to the Krylon paint issue, the report stated that stick-on labels are expected to deteriorate 7-10 years after application. Tamperproof seals could have provided one-to-one identification of containers at retrieval. Unfortunately, seal information was input into the data base only during the early part of 1984; input was discontinued by the end of the year.[21]

DOE has not ensured that labels on containers of retrievably stored suspect mixed waste are not obstructed, removed or otherwise unreadable.

Containment

WAC 173-303-400 and by reference WAC 173-303-630(7)(a) require that container storage areas constructed or installed after September 30, 1986, or those that Ecology otherwise requires include secondary containment because there is a potential threat to public health or the environment due to the nature of the wastes stored or due to a history of spills or releases from stored containers,[22] must have a containment system capable of collecting and holding spills, leaks, and for uncovered areas, additional volume that would result from the precipitation of a maximum 25 year storm of 24 hours duration.

The regulations do provide that containment is not required if all of the following conditions are met: the containers (1) do not contain free liquids, (2) do not exhibit ignitability or reactivity characteristics, (3) are not designated as containing waste codes F021, F022, F023, F026, or F-027, (4) are stored in areas sloped or otherwise operated to drain and remove liquids from precipitation; and (5) are elevated or are otherwise protected from contact with accumulated liquid.

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[19] See "The History of the 200 Area Burial Ground Facilities", WHC-EP-0912, J D. Anderson, September 1996, Section 4.4.7.

[20] See "Contact-Handled Transuranic Waste Characterization Based on Existing Records", WHC-EP-0225, Revision 1, September 1991, Section 5.

[21] Ibid

[22] See WAC 173-303-400(3)(a)(ii).

DOE has documented that liquid hazardous organic waste has been placed in retrievable storage in burial ground 218-W-3A.[23] In addition, and although DOE does not document specifically which other burial grounds may pose similar risks, its 1991 report cautions that RSW drums may contain flammable or explosive gas mixtures due to the presence of solvents, chemical decomposition and bacteriological actions. It further notes that sealed metal containers will have to be vented during retrieval operations to mitigate the risks associated with these dangers.[24] Originally, and primarily in 218-W-3A and 218-E-12B, steel drums were placed directly on the soil and backfilled. Liquids from precipitation were not prevented from migrating through the soil column surrounding the waste containers.[25] For example, DOE has documented that, at least in 1979, a combination of heavy snowfall and a subsequent quick warming, brought on by a Chinook wind, caused snow to melt and flood DOE's 218-W-3A, 218-W-4B and 218-W-4C burial grounds[26] Drums containing suspect mixed waste floated in the water covering 218-W-4C, and in 218-W-4B, water was deep enough that it almost overflowed into remote handled waste caissons. DOE has not protected these burial grounds from contact with accumulated liquid.

Ecology finds that the wastes stored in DOE burial grounds 218-E-12B, 218-W-3A, 218-W-4B, and 218-W-4C pose a potential threat to human health and the environment due to hazardous constituents and transuranic elements known to have been stored there, the manner in which these RSW wastes are stored, and known and threatened spills and releases from said containers. DOE's Risk Data Sheet[27] identifies that "There is a medium to high risk of public health and safety impact due to ground water contamination and causing radioactive and hazardous constituents to reach the Columbia River upstream of significant population centers". As to the environmental impact, the Risk Data Sheets state the "Solid waste remains underground in deteriorating containers causing soil and eventual groundwater contamination".

Management of Containers

WAC 173-303-400 and by reference 40 CFR 265.173(b) requires that a container holding dangerous waste must not be opened, handled, or stored in a manner which may cause it to rupture or leak.

Preceding text has documented DOE's practice of placing in trenches RSW containing suspect mixed waste, and filling such trenches such that they are in direct contact with soil and/or required inspections can not be performed. Storage of waste in this manner, by its very nature, constitutes storage in a manner that may cause the containers to rupture or leak. Furthermore, DOE's RSW containing suspect mixed waste remains within the RSW trenches today, despite DOE knowledge of corrosion, and the fact that many such waste containers are beyond their projected life span.

RSW drums containing suspect mixed waste were originally placed in earthen trenches on their sides and covered with approximately 4 feet of earth. DOE's own conclusions are that this type of storage

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[23] See "The History of the 200 Area Burial Ground Facilities", WHC-EP-0912, J.D. Anderson, September 1996, Section 2.3.26.

[24] See "Contact-Handled Transuranic Waste Characterization Based on Existing Records", WHC-EP-0225, Revision 1, September 1991, Section 4.10.

[25] See "The History of the 200 Area Burial Ground Facilities", WHC-EP-0912, J.D. Anderson, September 1996, Section 4.4.

[26] See "The History of the 200 Area Burial Ground Facilities", WHC-EP-0912, J.D. Anderson, September 1996, Section 2.11.

[27] See US Department of Energy, EM Management Plan, Risk Data Sheet Number R96N0013.

will lead to "container penetration and loss of structural integrity from corrosion in much less than 20 yr."[28] "The 218-E-12B burial ground was the first Hanford site burial ground to receive segregated TRU wastes. Drums were placed horizontally with direct soil coverage. The containers were placed in the earthen trench without plywood or nylon tarp coverage."[29] "The 218-W3A burial ground has no asphalt pads and used only earthen-bottom (gravel-fill) trenches . . . The drums were stacked horizontally from 1970 to approximately 1974. During this time, no tarp or plywood was used to cover the waste.[30] The second generation of storage for RSW was in drums placed in a concrete trench in the shape of a "V". This trench configuration was only used in burial ground 218-W-4B, for a portion of trench 7 (referred to as TV-7) and resulted[31] in the weight of all the drums being placed on the bottom drum. Use of the "V" trench was discontinued because it was "so expensive and put excessive weight on the bottom drum"[32]. In trench 11 of 218-W-3A, drums were stacked horizontally on the earthen floor before 1973.[33] DOE has managed all these drums in a manner which may cause them to rupture or leak.

In addition to these practices, some DOE RSW containing suspect mixed waste is stored in caissons within the 218-W-4B burial ground. Caissons are buried concrete (tank-like) structures with a bent stack rising up to ground level. Waste packages were allowed to free fall into the caissons, resulting in damage, and at times the rupture of packages. DOE has documented one instance where at least one container broke open and organic solvent fumes came out the exhaust.[34] DOE has handled and/or stored its RSW containers in a manner that may cause them to rupture or leak.

Land Disposal Restrictions

WAC 173-303-140 and by reference 40 CFR Part 268 establishes treatment standards that must be applied to certain hazardous wastes prior to land disposal, and restricts the storage of such wastes in order to preclude generators from using long-term storage to avoid treatment.

DOE's RSW wastes that designate as hazardous waste are subject to Land Disposal Restriction (LDR) requirements. DOE's failure to designate its RSW and its continued storage violate LDR requirements. These requirements impose treatment standards for all hazardous waste prior to disposal to land. The regulations allow storage of restricted waste (hazardous waste that has not been treated) solely for purposes of accumulating such quantities of hazardous waste as is necessary to facilitate proper recovery, treatment and disposal, and only if each waste container is clearly marked to identify its contents and the date each period of accumulation begins. Since at least August 19, 1987, DOE has stored LDR-restricted mixed low-level waste (MLLW) and mixed transuranic waste (TRUM) for

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[28] See "Contact-Handled Transuranic Waste Characterization Based on Existing Records", WHC-EP-0225, Revision 1, September 1991, Section 6.5.

[29] See "Contact-Handled Transuranic Waste Characterization Based on Existing Records", WHC-EP-0225, Revision 1, September 1991, Section 5.1.1

[30] See "Contact-Handled Transuranic Waste Characterization Based on Existing Records", WHC-EP-0225, Revision 1, September 1991, Section 5.1.2.

[31] See "Contact-Handled Transuranic Waste Characterization Based on Existing Records", WHC-EP-0225, Revision 1, September 1991, Section 5.1.3.

[32] See "The History of the 200 Area Burial Ground Facilities", WHC-EP-0912, J.D. Anderson, September 1996, Section 2.3.29.

[33] See "Contact-Handled Transuranic Waste Characterization Based on Existing Records", WHC-EP-0225, Revision 1, September 1991, Section 5.1.3.

[34] See "The History of the 200 Area Burial Ground Facilities", WHC-EP-0912, J.D. Anderson, September 1996, Section 2.10.1.

reasons other than, and in a manner other than, allowed by the regulations. DOE already has accumulated sufficient MLLW and TRUM at the Hanford facility to facilitate proper recovery, treatment and disposal. Moreover, DOE's RSW is not stored in containers clearly marked to identify their contents and the date each period of accumulation began.

Imminent and Substantial Endangerment

Continued storage of RSW in the manner described above poses significant, immediate, and ongoing risk of release and of exposure to humans and the environment. In its 1996 Risk Data Sheet documenting the environmental risks of specific work elements, DOE stated that with regard to the RSW "There is a medium to high risk of public health and safety impact due to ground water contamination and causing radioactive and hazardous constituents to reach the Columbia River upstream of significant population centers". As to the environmental impact, the Risk Data Sheets state that the "Solid waste remains underground in deteriorating containers causing soil and eventual groundwater contamination"[35] Such storage constitutes an imminent and substantial endangerment to the public and the environment. DOE has been aware of this risk at least since 1996, yet has made little progress toward retrieving the RSW and mitigating the risks.

II. DOE transuranic, transuranic mixed waste, and mixed low-level wastes (MLLW) currently stored above ground, and similar wastes projected to be generated (newly generated waste).

In addition to RSW, DOE is now storing a substantial volume of mixed wastes above ground (so called "legacy wastes") and expects to generate significant additional volumes of solid waste as Hanford site cleanup activities proceed, e.g., wastes that will be generated during the decommissioning of Hanford site facilities. DOE's Solid Waste Information Tracking System (SWITS) database identifies (as of 12/31/02) that DOE is storing 6,539 cubic meters of MLLW and 2,747 cubic meters of TRUM that have not been treated to LDR requirements. These wastes are similarly subject to requirements for the designation and subsequent appropriate management found at WAC 173-303.

For these reasons, in order to abate imminent and substantial endangerment to public health and the environment posed by DOE's continued mismanagement of the aforementioned wastes, and in accordance with Chapter 70.105 RCW, **IT IS ORDERED** that the DOE take the following actions:

A. Regarding the Retrieval, designation and treatment of DOE contact-handled (CH)[36] retrievably stored waste (RSW) to meet federal and state Land Disposal Restriction (LDR) standards (all CH RSW waste regardless of package size):

i. DOE shall retrieve all CH-RSW within burial grounds 218-W-4C, 218-W-4B, 218-W-3A, and 218-E-12B by December 31, 2010. In achieving this retrieval requirement, DOE shall first initiate full scale retrieval at its burial ground 218-W-4C (starting in trench 4) no later than October 1, 2003, and shall retrieve RSW at a rate of no less than 2,000 cubic meters / calendar year (A minimum of 500 cubic meters shall be retrieved in calendar year 2003).

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[35] See US Department of Energy, EM Management Plan, Risk Data Sheet Number R96N0013.

[36] For purposes of this Order, contact handled waste is waste packages with surface exposure rates of 200 millirems/hr or less.

DOE shall continue retrieval actions in 218-W-4C until all RSW is retrieved. Subsequent full scale retrieval actions, at the retrieval rate of no less than 2,000 cubic meters per calendar year, shall be undertaken sequentially at burial grounds 218-E-12B, 218-W-3A, and 218-W-4B. Retrieval of waste out of the ordered sequence shall not be counted toward the 2,000 cubic meter per year requirement unless Ecology gives advance written approval. This sequence is prioritized based on environmental risk and intended to ensure that DOE first addresses potential carbon tetrachloride contamination issues at 218-W-4C, and to subsequently retrieve wastes from burial ground 218-E-12B and 218-W-3A where containers were stored in configurations that allowed direct contact with the soil. DOE shall conclude retrieval actions with Burial ground 218-W-4C

For purposes of this Administrative Order, retrieval is defined as uncovering wastes within DOE's RSW trenches and removing such wastes from the trenches to permitted, and compliant, safe storage at the Central Waste Complex (CWC). Such storage shall include secondary containment pursuant to WAC 173-303-630(7).

ii. As RSW retrieval proceeds, DOE shall sample and analyze trench substrates with the purposes of determining whether or not a release(s) of contaminants to the environment has occurred, and, if so, the nature and extent of contamination.

Such sampling and analysis shall be in accordance with a DOE and Ecology approved Sampling and Analysis Plans (SAP). SAPs shall include, but are not limited to the following: a) sampling of burial ground vent risers for all burial ground contaminants of concern, b) sampling substrate soils for all burial ground contaminants of concern, e.g., CPT / auger / geoprobe and other methods as appropriate, c) a description of deeper characterization efforts (bore holes, etc) that shall be undertaken dependent on the results of vent riser and shallow substrate soil sampling, and d) a description of subsequent regulatory corrective action planning documents to be developed as may be necessary, using an "observational approach" where warranted. DOE will provide Ecology with a draft 218-W-4C SAP by 7/31/03. Ecology will review, revise as needed and issue a final for DOE's implementation (Ecology's intention is to issue a final SAP within 45 days). With respect to the remaining burial grounds, DOE will provide Ecology with a draft SAP three months prior to initiating retrieval. DOE will implement approved SAPs, as a requirement of this Order, during retrieval of all RSW.

The results of burial ground vent and substrate sampling and analysis pursuant to approved SAPs shall be submitted to Ecology by letter reports quarterly. Such reports shall document results and methodologies, shall assess results against regulatory requirements, shall include a description (or descriptions) of documented contaminant releases to the environment, and shall describe planned and/or scheduled additional work. Ecology reserves the right to require additional work pursuant to its regulatory authorities and responsibilities.

iii. DOE shall immediately and directly transport all CH RSW removed from RSW trenches to CWC for designation and storage of mixed waste and suspect mixed waste pending treatment, processing and/or disposition as required by this Order.

iv. DOE shall fully designate all CH RSW retrieved from the RSW trenches pursuant to WAC 173-303-070, within 90 days of retrieval. Designation shall occur at CWC.

v. Within 6 months of designation of any waste as mixed and as containing LDR restricted constituents, DOE shall treat such wastes to meet LDR requirements. For transuranic wastes designated as mixed and containing LDR restricted constituents, DOE may choose to complete, within 6 months of designation, certification of such waste for disposal at WIPP in lieu of LDR treatment[37], provided that Ecology is notified in writing of such completion of certification.

B. Regarding the retrieval, designation and LDR treatment of Remote Handled (RH)[38] RSW (all RSW RH waste regardless of package size, including the 200 area.

i. DOE shall initiate full scale retrieval of RH RSW by January 1, 2011. Retrieval of non-caisson RH TRUM shall be completed by December 31, 2014. For RH TRUM waste in the 200 Area burial grounds retrieval shall be completed by December 31, 2018. This shall include the retrieval of all RH waste from DOE caissons in the 218-W-4B burial grounds.

For purposes of this Administrative Order, retrieval is defined as uncovering wastes within DOE's RSW trenches and caissons and removing such wastes to permitted, and compliant, safe storage. Such storage shall include secondary containment pursuant to WAC 173-303-630(7).

ii. DOE shall immediately and directly transport all removed RH RSW to a compliant storage facility.

iii. DOE shall fully designate all retrieved RH RSW pursuant to WAC 173-303-070, within 90 days of retrieval.

iv. Within 6 months of designation of any RH RSW as mixed and as containing LDR restricted constituents, DOE shall treat such waste to meet LDR requirements. For transuranic wastes designated as mixed and containing LDR restricted constituents, DOE may choose to complete, within 6 months of designation, certification of such waste for disposal at WIPP rather than meet LDR treatment requirements, provided that Ecology is notified in writing of such completion of certification.

In addition to DOE RSW addressed by the preceding terms, DOE has, and continues to generate mixed, and suspect mixed, wastes at Hanford facilities undergoing cleanup. Such wastes are also subject to State requirements for the designation, proper storage, and treatment as necessary to meet federal and state standards prior to disposal. DOE continues to have a significant buildup of these wastes, many of which have not yet been designated, and have not been afforded treatment as required by law, despite knowledge of their content. As a result, DOE treatment of such wastes has been occurring only at a very small scale.

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[37] For purposes of this Administrative Order, completion of WIPP certification is defined as: (1) completion of the processing and packaging of the transuranic waste into final shipping containers according to the requirements of the WIPP Waste Acceptance Plan (WIPP WAP), and Waste Acceptance Criteria (WIPP WAC), including requirements of the Hazardous Waste Facility Permit for WIPP issued by the New Mexico Environment Department and (2) DOE submittal of documentation to Ecology attesting to such completion.

[38] For purposes of this Order remote handled waste is waste packages with surface exposure rates greater than 200 mrems/hr.

C. Regarding solid wastes generated following issuance of this Order (newly generated wastes).

i. DOE shall fully designate all newly generated solid wastes at the point and time of generation. Such designation shall comply with the requirements of WAC 173-303-070.

ii. DOE shall immediately stop creating a backlog of untreated mixed waste. DOE shall treat to meet LDR treatment requirements, all newly generated mixed wastes containing LDR constituents, in compliance with WAC 173-303-140 and by reference 40 CFR 268.

iii. RH-TRUM generated between the time of this Order and December 31, 2008 shall be treated in compliance with the schedule in Section D(iii) of this Order. For RH-TRUM generated after December 31, 2008 DOE shall treat to meet LDR treatment requirements, all newly generated RH-TRUM containing LDR constituents, in compliance with WAC 173-303-140 and by reference 40 CFR 268.

iv. RH-MLLW generated between the time of this Order and June 30, 2008 shall be treated in compliance with the schedule in Section F(ii) of this Order. For RH-MLLW generated after June 30, 2008 DOE shall treat to meet LDR treatment requirements, all newly generated RH-MLLW containing LDR constituents, in compliance with WAC 173-303-140 and by reference 40 CFR 268.

For newly generated transuranic mixed waste, DOE may choose to complete certification of such waste for disposal at WIPP in lieu of LDR treatment, provided that Ecology is notified in writing of such completion of certification.

D. Regarding Transuranic mixed waste currently in above ground storage.

i. By 12/31/03, DOE shall fully designate according to the requirements of WAC 173-303-070 all suspect mixed transuranic waste currently in above ground storage.

ii. For the CH-transuranic waste that designates as mixed and as containing LDR restricted constituents, DOE shall treat these wastes to meet LDR requirements within 6 months of designation. DOE may choose to complete, within 6 months of designation, certification of such waste for disposal at WIPP in lieu of LDR treatment requirements, provided that Ecology is notified in writing of such completion of certification.

iii. For the RH-TRUM that designates as mixed and as containing LDR restricted constituents, DOE shall complete LDR treatment of 200 cubic meters of RH-TRUM by December 31, 2008 and complete treatment of an additional 200 cubic meters RH-TRUM per year thereafter. DOE may choose to complete certification of such waste for disposal at WIPP in lieu of LDR treatment, provided that Ecology is notified in writing of such completion of certification.

E. Regarding CH-MLLW currently in above ground storage.

i By 12/31/04, DOE shall fully designate according to the requirements of WAC 173-303-070 all suspect CH mixed low-level waste currently in above ground storage.

ii CH-MLLW in storage at DOE's Central Waste Storage Complex (CWC) and elsewhere at Hanford as of 12/31/02 (as identified in DOE HFFACO milestone M-26-01 LDR Report MLLW treatability groups MLLW-02 through MLLW-10, excluding MLLW-7 remote handled MLLW) that has not been treated to meet LDR requirements is estimated to be 5,858 cubic meters (This volume does not include 600 cubic meters of waste requiring thermal treatment, as that is required to be treated by 2006 under Hanford Federal Facility Agreement and Consent Order (HFFACO) milestones M-91-12 and M-91-12A). With this exception, DOE shall treat its current above-ground stored CH-MLLW to meet LDR requirements on a schedule meeting, at minimum, the following;

- 450 cubic meters shall be treated by 12/31/03,
- 1,350 cubic meters (cumulative) shall be treated by 12/31/04,
- 2,250 cubic meters by (cumulative)shall be treated by 12/31/05,
- 3,150 cubic meters (cumulative) shall be treated by 12/31/06,
- 4,050 cubic meters (cumulative) shall be treated by 12/31/07,
- 4,950 cubic meters (cumulative) shall be treated by 12/31/08, and
- Complete treatment of all legacy waste (stored in CWC as of 12/31/02) by 12/31/09

F. Regarding RH-MLLW currently in storage.

For RH-MLLW in storage at DOE's Central Waste Storage Complex (CWC) and elsewhere at Hanford as of 12/31/02 (as identified in DOE HFFACO milestone M-26-01 LDR Report MLLW treatability groups MLLW-07) that has not been treated to meet LDR requirements is estimated to be 81 cubic meters. In addition DOE currently estimates that it will have approximately 138 cubic meters of RH-TRUM in storage by 2006, 500 cubic meters in storage by 2010, and 611 cubic meters by 2012.

i. By 12/31/04, DOE shall fully designate according to the requirements of WAC 173-303-070 all suspect RH mixed low-level waste currently in above ground storage.

ii. DOE shall begin treating RH MLLW to meet LDR treatment requirements at a rate of 100 cubic meters per year beginning no later than June 30, of 2008. If there is not 100 cubic meters of RH-MLLW in storage in any given year, this Order requires that DOE treat only that amount that is in storage. If actual volumes of newly generated RH wastes are significantly more than the estimated volumes, this Order will be revised to reflect actual volumes.

G. By September 30 of each year, DOE shall submit to Ecology a report describing completed and scheduled RH waste related work in accordance with the requirements of this Administrative Order. DOE's reports will document work completed during the previous federal fiscal year and work scheduled for the coming fiscal year. DOE's reports shall identify by citation all publicly available reports describing pertinent project issues and accomplishments, and shall identify approved projects and funding levels for the coming year.

H. DOE shall perform sufficient work to assure with reasonable certainty that DOE will accomplish the work required by this Administrative Order.

Documents required to be submitted under the terms of this Order shall be addressed to:

Department of Ecology
Attn: Bob Wilson
1315 West Fourth Avenue
Kennewick, Washington 99336-6018

Failure to comply with this Order may result in the issuance of civil penalties, or other actions, whether administrative or judicial, to enforce the terms of this Order. This Order may be appealed. Your appeal must be filed with within thirty (30) days of your receipt of this Order at the following address:

Washington Pollution Control Hearings Board
P.O. Box 40903
Olympia, Washington 98504-0903

At the same time, your appeal must also be sent to:

Bob Wilson
Department of Ecology
1315 West Fourth Avenue
Kennewick, Washington 99336-6018

Your appeal alone will not stay the effectiveness of this Order. Stay requests must be submitted in accordance with RCW 43.21B.320. These procedures are consistent with Chapter 43.21B RCW.

DATED this 30th day of April, 2003 at Olympia, Washington.

Tom Fitzsimmons, Director
Washington State Department of Ecology